

URS Consultants, Inc.  
ARCS, EPA Regions VI, VII and VIII  
Contract No. 68-W9-0053

YSTL/PA  
Signature Page  
Revision: 0  
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Page i of iii

## PRELIMINARY ASSESSMENT

Yankton Sioux Tribal Landfill  
Ravinia, South Dakota

U.S. EPA Contract No. 68-W9-0053  
Work Assignment No. 18-8JZZ

EPA ID # SDD987674538

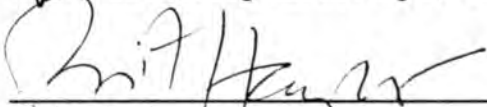
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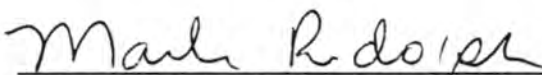
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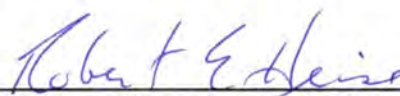
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Date: 7-29-94

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## DISTRIBUTION LIST

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## PRELIMINARY ASSESSMENT

### Yankton Sioux Tribal Landfill Ravinia, South Dakota

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## 1.0 INTRODUCTION

This Preliminary Assessment (PA) of the Yankton Sioux Tribal Landfill (YSTL) (EPA ID #SDD987674538) near Ravinia, South Dakota, has been prepared to satisfy the requirements of Work Assignment (WA) No. 18-8JZZ issued to URS Consultants, Inc. (URS) by the Region VIII office of the U.S. Environmental Protection Agency (EPA).

URS personnel conducted a site reconnaissance at the YSTL on June 7, 1994. This PA is the result of observations made during the site reconnaissance, personal correspondence with local historical societies, information gathered from EPA Files and other sources.

## 2.0 OBJECTIVES

The objectives of this PA report are to:

- Characterize potential waste sources;
- Assess potential contaminant characteristics and quantity;
- Assess potential routes for contaminant migration;
- Identify local receptor targets potentially at risk from contaminant migration; and
- Determine the potential impacts to public health and the environment.

## 3.0 SITE DESCRIPTION

### 3.1 SITE LOCATION

The YSTL is located in Charles Mix County approximately two miles south and two miles west of the city of Ravinia, South Dakota (Figure 1). More specifically, the YSTL is located in the southwest quarter of the southwest quarter of Section 19, T. 96 N., R. 64 W. Site coordinates are 43° 06' 00.0" N. latitude and 98° 27' 30.0" W. longitude (U.S. Geological Survey (USGS) 1964b). The YSTL is a former municipal landfill, located on property owned by the Yankton Sioux Indian Tribe (Bureau of Indian Affairs (BIA) 1994). The YSTL is comprised by approximately 40 acres located in rolling hills.



Surrounding land is agricultural. To reach the YSTL from Ravinia, South Dakota, follow the main road south for approximately two miles and turn west. Follow this road for approximately two miles. The YSTL is on the north side of the road.

### 3.2 SITE HISTORY AND PREVIOUS WORK

The YSTL operated as a municipal dump from approximately 1972 to approximately 1987. Very little is known of the operations at the YSTL; the file kept by the Yankton Sioux Indian Tribe was misplaced during a recent office move. The YSTL was covered with an unspecified amount of dirt fill (BIA 1994).

### 3.3 SITE CHARACTERISTICS

#### 3.3.1 Geology

Surficial deposits of the Ravinia area are the result of late Wisconsin Age glaciation. Glacial deposits, 0 to 450 feet in thickness, consist of glacial till overlying buried glacial outwash. These glacial deposits are comprised of brown to gray clay, silt, gravel and sand of undifferentiated till overlying beds of outwash sediments. The glacial deposits have a hydraulic conductivity ranging from  $10^{-3}$  to  $10^{-5}$  centimeters per second (cm/sec) (State of South Dakota Geological Survey 1977).

Underlying the glacial till and outwash is Pierre Shale ranging in thickness from 0 to 600 feet. The Pierre Shale is considered an impermeable layer with a hydraulic conductivity less than  $10^{-8}$  cm/sec. Approximately 0 to 55 feet of Codell Sandstone underlie the Pierre Shale Formation. The hydraulic conductivity of the Codell Sandstone ranges from  $10^{-5}$  to  $10^{-7}$  cm/sec. Approximately 100 to 250 feet of Carlile and Graneros Shale underlie the Codell Sandstone Formation. The Carlile and Graneros Shale is considered an impermeable layer with a hydraulic conductivity less than  $10^{-8}$  cm/sec. The Dakota Sandstone Formation underlies the Carlile and Graneros Shale and has

an average thickness ranging from 88 to 450 feet. Dakota Sandstone has a hydraulic conductivity ranging from  $10^{-5}$  to  $10^{-7}$  cm/sec (State of South Dakota Geological Survey 1977).

### 3.3.2 Hydrogeology

The Glacial Aquifer, located approximately 20 to 400 feet below ground surface (bgs), is the predominant groundwater supply for domestic use in the Ravinia region. The Glacial Aquifer is comprised of the clay, silt, gravel and sand of the Wisconsin glacial till and outwash (State of South Dakota Geological Survey 1966).

Underlying the shallow Glacial Aquifer is the Codell Aquifer. Located approximately 270 to 710 feet bgs, the Codell Aquifer is the second largest groundwater supply for the Ravinia region. The Codell Aquifer is under confined conditions and is separated from the shallow Glacial Aquifer by the impermeable Pierre Shale (State of South Dakota Geological Survey 1966).

Groundwater in the Dakota Aquifer is located approximately 700 to 900 feet bgs and is under confined conditions. The Dakota Aquifer is not used for water supply in the Lake Andes region (State of South Dakota Geological Survey 1966).

### 3.3.3 Hydrology

Site drainage flows overland to the east for approximately one quarter of a mile where an unnamed intermittent stream intercepts the overland flow. This unnamed intermittent stream flows to the north and remains intermittent for approximately five miles before discharging into Lake Andes (Figure 1) (USGS 1964a; USGS 1964b).

Lake Andes has a high water level, regulated by a spillway which was installed in approximately 1922. During times of high precipitation, water from Lake



Andes flows from the spillway to an underground aqueduct and discharges into the intermittent Garden Creek. Garden Creek flows south approximately two miles to Lake Francis Case. Lake Francis Case is a man-made lake created when the Fort Randall Dam was built on the Missouri River. The Missouri River at the Fort Randall Dam has a mean flow rate of 25,500 cubic feet per second (cfs) (Figure 1) (USGS 1991). The flow rates of the unnamed intermittent stream near the YSTL and the intermittent Garden Creek are unknown. Lake Andes has not discharged water through the spillway to Garden Creek since approximately 1989 (Lake Andes National Wildlife Refuge 1994).

#### **3.3.4 Meteorology**

The YSTL is located in a moderate climate zone. The mean annual precipitation as calculated from the University of Delaware (UD) database is 24.6 inches. The net annual precipitation as calculated from precipitation and evapotranspiration data obtained from UD is 5.2 inches (University of Delaware (UD) 1986). The 2-year, 24-hour rainfall event for this area is 2.5 inches (Dunne and Leopold 1978).

### **4.0 PRELIMINARY PATHWAY ANALYSIS**

#### **4.1 WASTE CHARACTERIZATION**

The YSTL is reported to have received municipal solid wastes, household garbage and appliances. It is unknown if agricultural wastes (pesticides and herbicides) were deposited at the YSTL.

The YSTL covers approximately 40 acres. Waste quantity is estimated at approximately 650,000 cubic yards of municipal wastes based on estimates that the YSTL covers approximately 40 acres and wastes are approximately ten feet deep (URS Consultants, Inc. (URS) 1994).

#### 4.2 AIR PATHWAY ANALYSIS

The landfill has been covered over with an unspecified amount of fill material. No debris or evidence of a landfill was visible during the site reconnaissance (URS 1994). The town of Ravinia, located approximately two miles northeast of the YSTL, has a population of approximately 79 persons. Approximately 15 persons live within the one-mile radius of influence (U.S Department of Commerce (USDOC) 1990).

#### 4.3 GROUNDWATER PATHWAY ANALYSIS

The YSTL is not believed to contain any type of maintained engineered cover, run-on control systems, run-off management systems, leachate collection systems or liner. The depth of wastes deposited at the YSTL is unknown (BIA 1994).

Nine domestic wells were documented in 1966 to be located within four miles of the YSTL; however, a majority of the rural farm houses in the Ravinia area now have rural water connections and do not use their former groundwater wells (City of Lake Andes 1994; State of South Dakota Geological Survey 1966). The exact number of groundwater wells currently in use and the location of the closest groundwater well are unknown. Water for the rural water supply is pulled from the Missouri River immediately below the Fort Randall Dam and supplies the towns of Lake Andes, Ravinia, Wagner, Pickstown and Marty (City of Lake Andes 1994).



#### 4.4 SURFACE WATER PATHWAY ANALYSIS

The YSTL is not believed to contain any type of maintained engineered cover, run-on control systems, run-off management systems, leachate collection systems or liner (BIA 1994).

Approximately five miles of intermittent stream lie between the YSTL and Lake Andes, the closest body of surface water. Approximately eight miles of palustrine emergent wetland frontage are located along the intermittent stream downstream from the YSTL (U.S. Department of the Interior, Fish and Wildlife Service (USFWS) 1989a; USFWS 1989b). Because the mean annual precipitation is greater than 20 inches and the Lake Andes National Wildlife Refuge is farther than two miles of intermittent stream away, these surface water targets are not to be assessed under HRS guidelines (Office of the Federal Register 1990).

Several species of birds have documented habitats in the refuge including the federally designated endangered Whooping Crane (*Grus Americana*) and the federally threatened Bald Eagle (*Haliaeetus Leucocephalus*). The state of South Dakota endangered species, the Banded Killfish (*Fundulus Diaphanus*) is also documented to reside in Lake Andes (State of South Dakota, Department of Game, Fish and Parks 1994).

#### 4.5 SOIL EXPOSURE PATHWAY

The YSTL is located approximately one mile to the north and downgradient from the closest residence. There is no fence surrounding the YSTL. An unknown amount of fill material has been used to cover the YSTL. No debris or evidence of a landfill was visible during the site reconnaissance (URS 1994).

## 5.0 SUMMARY

Wastes at the YSTL are believed to consist primarily of municipal trash and household garbage. Wastes have been deposited to an unknown depth below ground surface and covered over with an unspecified amount of fill material. No debris or evidence of a landfill were visible during the site reconnaissance. There are no known targets associated with the groundwater, surface water, soil or air pathways.

## 6.0 LIST OF REFERENCES

Bureau of Indian Affairs (BIA). 1994. Personal communication with Lawrence Kayukan, Tribal Biologist, on July 19, 1994.

City of Lake Andes. 1994. Personal Communication with Russell Steadronsky, Mayor of Lake Andes, South Dakota, on June 14, 1994.

Dunne, Thomas and Luna B. Leopold. 1978. "Water in Environmental Planning." W. H. Freeman and Company, San Francisco.

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Office of the Federal Register. 1990. National Archives and Records Administration, December 14, 1990, Code of Federal Regulations (CFR) 40, Part 300, Hazard Ranking System (HRS) for Uncontrolled Hazardous Substances Releases. Appendix A of the National Oil and Hazardous Substances Release Contingency Plan; Final Rule, pp. 55 FR51537-51667.

State of South Dakota, Department of Game, Fish and Parks. 1994. Endangered and Threatened Species List for a Four Mile Radius from the Lake Andes Site.

State of South Dakota Geological Survey. 1966. Groundwater Supply for the City of Lake Andes, South Dakota, Special Report 37.

State of South Dakota Geological Survey. 1977. Geology and Water Resources of Charles Mix and Douglas Counties, South Dakota, Bulletin 22, Parts I and II.

U.S. Department of Commerce (USDOC), Bureau of Census. 1990. Summary Population and Housing Characteristics.



U.S. Department of the Interior, Fish and Wildlife Service (USFWS). 1989a. Wetlands Inventory Map of the Ravinia 7.5' Quadrangle, South Dakota.

U.S. Department of the Interior, Fish and Wildlife Service (USFWS). 1989b. Wetlands Inventory Map of the Wagner SW 7.5' Quadrangle, South Dakota.

U.S. Geological Survey (USGS). 1964a. 7.5' Topographic Map, Ravinia Quadrangle, South Dakota.

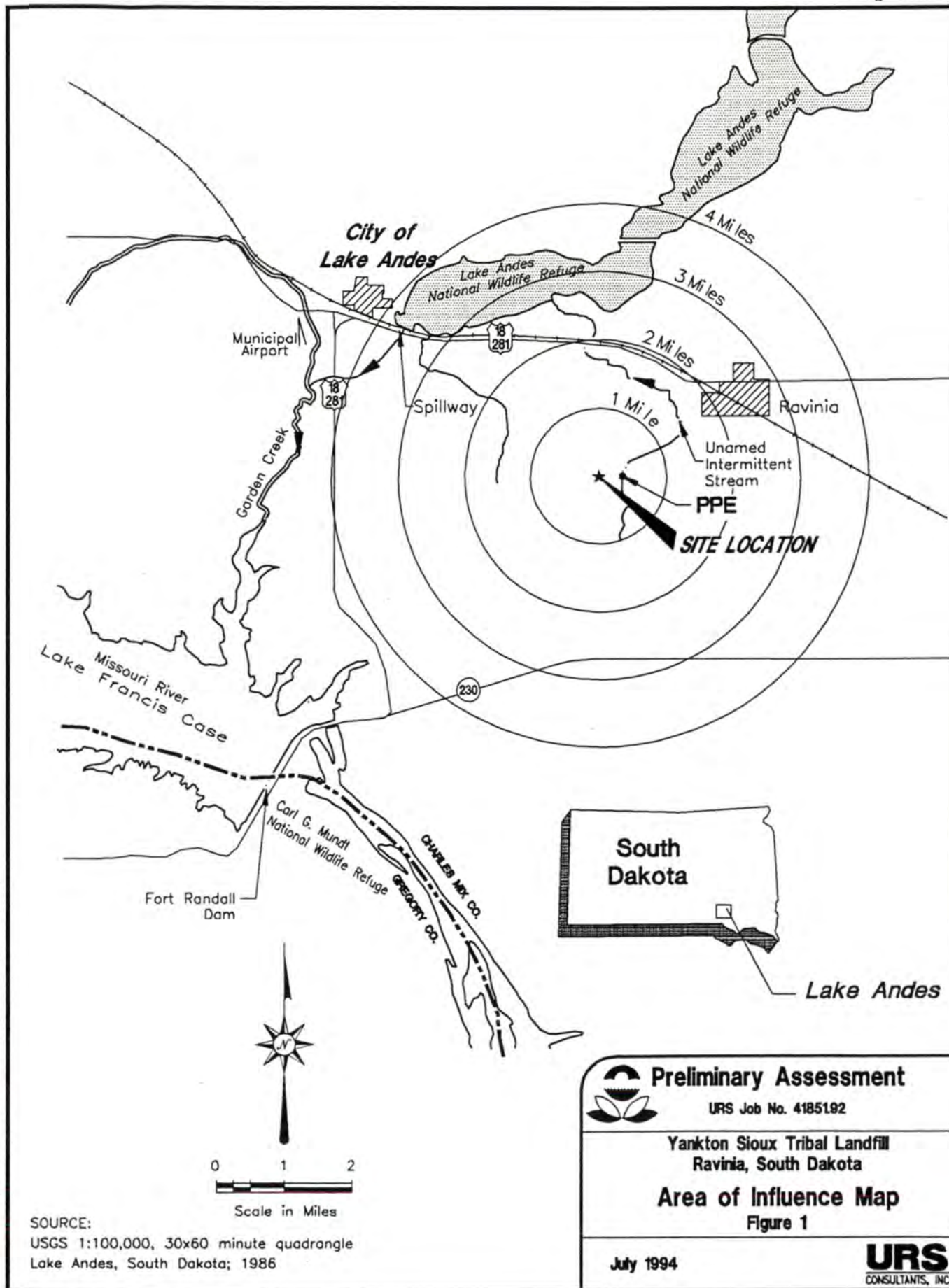
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U.S. Geological Survey (USGS). 1986. 1:100,000 Topographic Map of the Lake Andes 30' x 60' Quadrangle, South Dakota.

U.S. Geological Survey (USGS). 1991. Water Resource Data. South Dakota Water Year 1991. Volume 1.

University of Delaware (UD) Center for Climate Research, Department of Geography. 1986. Terrestrial Water Budget Data Archive; Version 1.01, compiled by C. J. Willmott and C. M. Rowe.

URS Consultants, Inc (URS). 1994. Site Reconnaissance performed on June 7, 1994.



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**APPENDIX A**  
**PA Report Form 2050-0095**



OMB Approval Number: 2050-0095  
Approved for Use Through: 4/95

POTENTIAL HAZARDOUS		IDENTIFICATION	
WASTE SITE		State: SD	CERCLIS Number: SDD987674538
PRELIMINARY ASSESSMENT FORM		CERCLIS Discovery Date: 5/18/93	
1. General Site Information			
Name: Yankton Sioux Tribal Landfill		Street Address:	
City: Ravinia	State: SD	Zip Code: 57357	County: Charles Mix
			Co. Code: 023
Latitude: 43 6' 0.0"	Longitude: 98 27' 30.0"	Approx. Area of Site: 40 acres	Status of Site: Inactive
2. Owner/Operator Information			
Owner: Bureau of Indian Affairs		Operator: N/A	
Street Address: PO Box 5577		Street Address: N/A	
City: Wagner		City: N/A	
State: SD	Zip Code: 57380	Telephone: 605-384-3651	State: NA
			Zip Code: N/A
			Telephone: N/A
Type of Ownership: Indian		How Initially Identified: Federal Program	

POTENTIAL HAZARDOUS		IDENTIFICATION	
WASTE SITE		State: SD	CERCLIS Number: SDD987674538
PRELIMINARY ASSESSMENT FORM		CERCLIS Discovery Date: 5/18/93	
3. Site Evaluator Information			
Name of Evaluator:	Agency/Organization:	Date Prepared:	
Mark Rudolph	URS Consultants, Inc.	July 1994	
Street Address:	City:	State:	
1099 18th Street, Suite 700	Denver	CO	
Name of EPA or State Agency Contact:	Telephone:		
Bob Heise	303-294-7504		
Street Address:	City:	State:	
999 18th Street, Suite 500	Denver	CO	
4. Site Disposition (for EPA use only)			
Emergency Response/Removal Assessment	CERCLIS Recommendation: NFRAP	Signature:	
Recommendation: No		Name:	
Date:	Date:	Position:	

POTENTIAL HAZARDOUS		IDENTIFICATION	
WASTE SITE		State: SD	CERCLIS Number: SDD987674538
PRELIMINARY ASSESSMENT FORM		CERCLIS Discovery Date: 5/18/93	
5. General Site Characteristics			
Predominant Land Uses Within 1 Mile of Site:	Site Setting: Urban	Years of Operation: Beginning Year: 0 Ending Year: 0	
Type of Site Operations:	Waste Generated: Onsite		
	Waste Deposition Authorized By: Present Owner		
	Waste Accessible to the Public No		
	Distance to Nearest Dwelling, School, or Workplace: 0 Feet		
6. Waste Characteristics Information			
Source Type Landfill	Quantity 4.00e+01 acres	Tier A	General Types of Waste:
			Physical State of Waste as Deposited
Tier Legend C = Constituent    W = Wastestream V = Volume        A = Area			



POTENTIAL HAZARDOUS		IDENTIFICATION	
WASTE SITE		State: SD	CERCLIS Number: SDD987674538
PRELIMINARY ASSESSMENT FORM		CERCLIS Discovery Date: 5/18/93	
7. Ground Water Pathway			
Is Ground Water Used for Drinking Water Within 4 Miles:	Is There a Suspected Release to Ground Water:	List Secondary Target Population Served by Ground Water Withdrawn From:	
No	No		
Type of Ground Water Wells Within 4 Miles:	Have Primary Target Drinking Water Wells Been Identified: No	0 - 1/4 Mile	0
		>1/4 - 1/2 Mile	0
		>1/2 - 1 Mile	0
Depth to Shallowest Aquifer:		>1 - 2 Miles	0
0 Feet		>2 - 3 Miles	0
Karst Terrain/Aquifer Present:	Nearest Designated Wellhead Protection Area:	>3 - 4 Miles	0
No	None within 4 Miles	Total	0

POTENTIAL HAZARDOUS		IDENTIFICATION	
WASTE SITE		State: SD	CERCLIS Number: SDD987674538
PRELIMINARY ASSESSMENT FORM		CERCLIS Discovery Date: 5/18/93	
8. Surface Water Pathway		Part 1 of 4	
Type of Surface Water Draining Site and 15 Miles Downstream:	Shortest Overland Distance From Any Source to Surface Water:		
	0 Feet 0.0 Miles		
Is there a Suspected Release to Surface Water: No	Site is Located in: Annual - 10 yr floodplain		
8. Surface Water Pathway		Part 2 of 4	
Drinking Water Intakes Along the Surface Water Migration Path: No			
Have Primary Target Drinking Water Intakes Been Identified: No			
Secondary Target Drinking Water Intakes: None			

POTENTIAL HAZARDOUS	IDENTIFICATION
WASTE SITE	State: CERCLIS Number: SD SDD987674538
PRELIMINARY ASSESSMENT FORM	CERCLIS Discovery Date: 5/18/93

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8. Surface Water Pathway Part 3 of 4

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Fisheries Located Along the Surface Water Migration Path: No

Have Primary Target Fisheries Been Identified: No

Secondary Target Fisheries:  
None

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8. Surface Water Pathway Part 4 of 4

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Wetlands Located Along the Surface Water Migration Path? (y/n) No

Have Primary Target Wetlands Been Identified? (y/n) No

Secondary Target Wetlands:  
None

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Other Sensitive Environments Along the Surface Water Migration Path: No

Have Primary Target Sensitive Environments Been Identified: No

Secondary Target Sensitive Environments:  
None

POTENTIAL HAZARDOUS	IDENTIFICATION	
WASTE SITE	State: SD	CERCLIS Number: SDD987674538
PRELIMINARY ASSESSMENT FORM	CERCLIS Discovery Date: 5/18/93	

9. Soil Exposure Pathway

Are People Occupying Residences or  
Attending School or Daycare on or  
Within 200 Feet of Areas of Known  
or Suspected Contamination: No

Number of Workers Onsite: None

Have Terrestrial Sensitive Environments Been Identified on or Within  
200 Feet of Areas of Known or Suspected Contamination: No

10. Air Pathway

Total Population on or Within:	Is There a Suspected Release to Air: Yes
Onsite 0	
0 - 1/4 Mile 0	Wetlands Located
>1/4 - 1/2 Mile 0	Within 4 Miles of the Site: No
>1/2 - 1 Mile 15	
>1 - 2 Miles 79	Other Sensitive Environments Located
>2 - 3 Miles 100	Within 4 Miles of the Site: No
>3 - 4 Miles 370	
Total 564	

Sensitive Environments Within 1/2 Mile of the Site:  
None



**APPENDIX B**  
**EPA PA Worksheet**

## PA WORKSHEET

Site Name Yankton Sioux Tribal Landfill City, State Ravinia, South Dakota

CERCLIS ID # SDD987674538

Reported by Mark Rudolph, URS Consultants, Inc. Date July 1994

## HIGHLIGHTS:

A) IS THERE QUALITATIVE OR QUANTITATIVE EVIDENCE OF A RELEASE TO AIR, SURFACE WATER, GROUNDWATER, OR SURFACE SOIL? DESCRIBE BRIEFLY.

More detail in items GW-1 (for groundwater pathway), SW-5 (for surface water pathway), A-1 (for air pathway), and SE-1 (for soil exposure pathway).

No.

B) IS THERE EVIDENCE OF AN IMPACTED TARGET POPULATION? No.  
DESCRIBE.

Pathway	Target	None/target Size	Brief Description	More Discussion In
Groundwater	Public drinking Water supply	None	N/A	N/A
	Domestic drinking Water supply	None		
Surface Water	Drinking water	None	N/A	N/A
	Fishery	None		
	Sens. env.	None		
Soil Exposure	People within 200'	None	N/A	N/A
	Terrestrial sens. env.	None		
Air	Population	None	N/A	N/A

## SITE INFORMATION

- G-1. Directions to the site (from nearest easily recognized point).

From Ravinia, South Dakota, follow the main road south for approximately two miles and turn west. Follow this road for approximately two miles. The YSTL is on the north side of the road.

- G-2. Are there other potential sources in the neighborhood to be aware of as the site is evaluated? eg. Is the site in an industrial area, near a railroad, along a highway? Are sources with similar contaminants to this site in the vicinity?

No.

Source of information: URS 1994.

## Background/Operating History

- G-3. Describe the operating history of the site:

The YSTL operated as a municipal dump from approximately 1972 to approximately 1987. Very little is known of the operations at the YSTL. The YSTL was covered with an unspecified amount of dirt fill. The file kept by the Yankton Sioux Indian Tribe was misplaced during a recent office move and, hence, very little information is available.

Source of information: BIA 1994.

- G-4. Describe site and nature of operations (property size, manufacturing, waste disposal, storage etc.):

The YSTL covers approximately 40 acres. Waste quantity is estimated at approximately 650,000 cubic yards of municipal wastes based on estimates that the YSTL covers approximately 40 acres and wastes are approximately ten feet deep.

Source of information: URS 1994.



G-5. Describe any emergency or remedial actions that have occurred at the site:

None on record.

Source of information: BIA 1994

G-6. Are there records or knowledge of accidents or spills involving site wastes? Are there Emergency Response Notification (ERNs) reports for this location?

None on record.

Source of information: BIA 1994

G-7. Describe existing sampling data and briefly summarize data quality (e.g. sample objective, age/comparability, analytical methods, detection limits, QA/QC, validatability):

No sampling to date.

Source of information: BIA 1994

G-8. Is there any other local, state or federal regulatory involvement? Describe. Include permits, and names of contact individuals within each government organization. No.

AGENCY	PROGRAM	CONTACT	PHONE	PERMIT
Bureau of Indian Affairs	N/A	Lawrence Kayukan	605-384-3651	N/A

G-9. Attach site sketch or schematic. Include all pertinent features including wells, storage areas, underground storage tanks, source areas, buildings, access roads, areas of ponded water. Refer to figure(s) submitted with text of report if appropriate.

Refer to Figure 1.

## SOURCE CHARACTERIZATION

WC-1. Describe each source at the site, on Table 1, in terms of source type, containment, size/area/volume/quantity, and substances present. See HRS Tables 2-5 and 5-2 for source descriptions, Tables 3-2, 4-2, 4-8, 5-6, 6-3, and 6-9 for containment.

The YSTL is reported to have received municipal solid wastes, household garbage and appliances. It is unknown if agricultural wastes (pesticides and herbicides) were deposited at the YSTL. There is no known containment for the landfill.

The YSTL covers approximately 40 acres. Waste quantity is estimated at approximately 650,000 cubic yards of municipal wastes based on estimates that the YSTL covers approximately 40 acres and wastes are approximately ten feet deep (URS 1994).

WC-2. Briefly describe how waste quantity was estimated (eg. historical records or manifests, permit applications, air photo measurements, etc.):

The YSTL covers approximately 40 acres. Waste quantity is estimated at approximately 650,000 cubic yards of municipal wastes based on estimates that the YSTL covers approximately 40 acres and wastes are approximately ten feet deep (URS 1994).

Source of information: URS 1994.

WC-3. Describe any restrictions or barriers to accessibility of on-site sources.

A dirt cover of unknown thickness is present. No fence or barrier to the site is present.

Source of information: URS 1994.

## GROUNDWATER CHARACTERISTICS

GW-1. Any positive or circumstantial evidence of a release to groundwater? Describe.

None.

Source of information: BIA 1994.

GW-2. Any positive or circumstantial evidence of a release to drinking water users? Describe analytes, detection limits, background, hits, number of users, locations, QA/QC.

None.

Source of information: BIA 1994.

GW-3. Briefly describe the geologic setting.

Surficial deposits of the Ravinia area are the result of late Wisconsin Age glaciation. Glacial deposits, 0 to 450 feet in thickness, consist of glacial till overlying buried glacial outwash. These glacial deposits are comprised of brown to gray clay, silt, gravel and sand of undifferentiated till overlying beds of outwash sediments. The glacial deposits have a hydraulic conductivity ranging from  $10^{-3}$  to  $10^{-5}$  cm/sec (State of South Dakota Geological Survey 1977).

Underlying the glacial till and outwash is Pierre Shale ranging in thickness from 0 to 600 feet. The Pierre Shale is considered an impermeable layer with a hydraulic conductivity less than  $10^{-8}$  cm/sec. Approximately 0 to 55 feet of Codell Sandstone underlie the Pierre Shale Formation. The hydraulic conductivity of the Codell Sandstone ranges from  $10^{-5}$  to  $10^{-7}$  cm/sec. Approximately 100 to 250 feet of Carlile and Graneros Shale underlie the Codell Sandstone Formation. The Carlile and Graneros Shale is considered an impermeable layer with a hydraulic conductivity less than  $10^{-8}$  cm/sec. The Dakota Sandstone Formation underlies the Carlile and Graneros Shale and has an average thickness ranging from 88 to 450 feet. Dakota Sandstone has a hydraulic conductivity ranging from  $10^{-5}$  to  $10^{-7}$  cm/sec (State of South Dakota Geological Survey 1977).



GW-4. Describe geologic/hydrogeologic units on Table 2. Give names, descriptions, and characteristics of consolidated and unconsolidated zones beneath the site.

See Table 2.

GW-5. Is the site in an area of karst terrain or a karst aquifer?

No.

GW-6. Net Precipitation (per HRS section 3.1.2.2).

5.2 inches.

#### SURFACE WATER CHARACTERISTICS

SW-1. Mean annual precipitation (per HRS section 4.0.2)= 24.6 inches. If less than 20", then count intermittent channels as surface water.

SW-2. Discuss the probable surface water flow pattern from the site to surface waters:

Site drainage flows overland to the east for approximately one quarter of a mile where an unnamed intermittent stream intercepts the overland flow. This unnamed intermittent stream flows to the north and remains intermittent for approximately five miles before discharging into Lake Andes.

Lake Andes has a high water level, regulated by a spillway which was installed in approximately 1922. During times of high precipitation, water from Lake Andes flows from the spillway to an underground aqueduct and discharges into the intermittent Garden Creek. Garden Creek flows south approximately two miles to Lake Francis Case. Lake Francis Case is a man-made lake created when the Fort Randall Dam was built on the Missouri River. The Missouri River at the Fort Randall Dam has a mean flow rate of 25,500 cubic feet per second (cfs). The unnamed intermittent stream near the YSTL and the intermittent Garden Creek have unknown flow rates. Lake Andes has not discharged water through the spillway to Garden Creek since approximately 1989.

Source of information: Lake Andes National Wildlife Refuge 1994; URS 1994; USGS 1964a; USGS 1964b; USGS 1991.



SW-3. If surface water exists within 2 miles of the site, describe surface water segments within the 15-mile distance limit.

Segment Name	River/Lake/Type	Fresh/Salt Water	Start (mi.)	End (mi.)	Flow In cfs
N/A	N/A	N/A	N/A	N/A	N/A

Groundwater to surface water distance N/A Angle  $\Theta$  N/A

SW-4. Provide a schematic diagram or simple figure which describes surface water segments, locates targets, identifies flow direction, PPE(s), etc. Refer to figure(s) submitted with text of report if appropriate.

Refer to Figure 1, Area of Influence Map.

SW-5. Any positive or circumstantial evidence of a release to surface water? Evidence of a release by direct observation? Is the source located in surface water? Describe.

No.

Source of information: BIA 1994.

SW-6. Any positive or circumstantial evidence of a release to surface water target populations? Describe analytes, detection limits, background, hits, number of users, locations, QA/QC.

No.

Source of information: BIA 1994.

SW-8. Is the site or portions thereof located in surface water?

Is the site located in the 1 - <10 yr floodplain?

›10-100 yr?

›100-500 yr?

›500 yr?

SW-9. Two-year 24-hour rainfall 2.5 inches

TARGETS

T-1. Discuss groundwater usage within four miles of the site:

In 1966, groundwater usage within four miles of the site includes irrigation, stock watering and domestic. Current use of groundwater within one mile of the site is unknown.

Source of information: State of South Dakota, Geological Survey 1966.

T-2. Summarize the drinking water population served via groundwater within four miles of the site:

0 - 1/4 mi 0

1/4 - 1/2 mi 0

1/2 - 1 mi 0

1 - 2 mi 0

2 - 3 mi 0

3 - 4 mi 0

Attach calculations for population apportionment in blended systems.

T-3. Identify and locate any of the following surface water targets within 15 miles of the site: drinking water population(s) served by intakes, fisheries, sensitive environments described in Table 4-23 of the HRS, and wetlands as defined in the Federal Register.

Targets	Dist. From Site	SW Body	Flow In cfs	Population Served/Size (Incl. Units)	Contamination Known/Suspected
N/A	N/A	N/A	N/A	N/A	N/A

T-4. Summarize the population within a four-mile radius of the site:

	<u>Total Pop.</u>
on site	-----
0 - 1/4 mi	≈0
1/4 - 1/2 mi	≈0
1/2 - 1 mi	≈15
1 - 2 mi	≈79
2 - 3 mi	≈100
3 - 4 mi	≈370

T-5. Identify and locate any terrestrial sensitive environments described in Table 5-5 of the HRS.

None identified.

T-6. Describe any positive or circumstantial evidence of a release to air target populations? Of a release by direct observation where target population exists within 1/4 mile of the site? Describe analytes, detection limits, background, hits, number of users, locations, QA/QC.

No sampling to date.

T-7. Identify and locate any potential or known resident soil exposure populations, if present. Describe conditions which lead the researcher to suspect contaminated soil within 200' of residences, if this condition exists.

None suspected.



**TABLE 1**  
**WASTE CONTAINMENT AND HAZARDOUS SUBSTANCE IDENTIFICATION<sup>1</sup>**

SOURCE TYPE	SIZE (Volume/Area)	ESTIMATED WASTE QUANTITY	SPECIFIC COMPOUNDS	CONTAINMENT <sup>2</sup>	SOURCES OF INFORMATION
Landfill	≈ 40 acres	Estimated 650,000 cubic yards	Unknown	Unknown	BIA 1994.

<sup>1</sup> Use additional sheets if necessary.

<sup>2</sup> Evaluate containment of each source from the perspective of each migration pathway (e.g., groundwater pathway - non-existent, natural or synthetic liner, corroding underground storage tank; surface water - inadequate freeboard, corroding bulk tanks; air - unstabilized slag piles, leaking drums, etc.)

**TABLE 2**  
**HYDROGEOLOGIC INFORMATION<sup>1</sup>**

STRATA NAME/DESCRIPTION	THICKNESS (ft.)	HYDRAULIC CONDUCTIVITY (cm/sec)	TYPE OF DISCONTINUITY <sup>2</sup>	SOURCE OF INFORMATION
Glacial Aquifer	Between 0 - 350 feet	$\approx 10^{-4}$ to $10^{-6}$ cm/sec	Unknown	State of South Dakota, Geological Survey 1966
Codell Aquifer	Between 270 - 710 feet	$\approx 10^{-5}$ to $10^{-7}$ cm/sec	Unknown	State of South Dakota, Geological Survey 1966

<sup>1</sup> Use additional sheets if necessary.

<sup>2</sup> Identify the type of aquifer discontinuity within four miles from the site (e.g., river, strata "pinches out", etc.).

**APPENDIX C**  
**CERCLA Eligibility Worksheet**

## CERCLA Eligibility Worksheet

Site Name Yankton Sioux Tribal Landfill

City Lake Andes State South Dakota

EPA ID Number SDD987674538

Note: The site is automatically CERCLA eligible if it is a Federally owned or operated RCRA site.

### I. CERCLA Eligibility

Did the facility cease operations prior to November 19, 1980? No

If YES, then STOP. The facility is probably a CERCLA site.

If NO, continue to part II                     

### II. RCRA Deferral Factors

Did the facility file a RCRA Part A application? No

If YES:

1. Does the facility currently have interim status? No

2. Did the facility withdraw its Part A application? No

3. Is the facility a known or possible protective filer? (filed in error) No

4. Does the facility have a RCRA operating or post closure permit?                     

5. Is the facility a late (after 11/19/80) or non-filer that has been identified by the EPA or the State? (facility did not know it needed to file under RCRA) No

Type of facility:

Generator            Transporter                      Recycler             
TSD (Treatment/Storage/Disposal)                     

If all answers to questions 1, 2, and 3 are NO, STOP. The facility is a CERCLA eligible site.

If answer to #2 or #3 is YES, STOP. The facility is a CERCLA eligible site.

If answer to #2 and #3 are NO and any other answer is YES, site is RCRA, continue to part III.



III. RCRA Sites Eligible for the NPL

Has the facility owner filed for bankruptcy under Federal or State laws? \_\_\_\_\_

Has the facility lost RCRA authorization to operate or shown probable unwillingness to carry out corrective action? \_\_\_\_\_

Is the facility a TSD that converted to a generator, transporter or recycler facility after November 19, 1980? \_\_\_\_\_

IV. Exempted substances:

Does the release involve hazardous substances other than petroleum? \_\_\_\_\_

V. Other programs: The site may never reach the NPL or be a candidate for removal. We need to be able to refer it to any other programs in EPA or state agencies which may have jurisdiction, and thus be able to effect a cleanup. Responses should summarize available information pertaining to the question. Include information in existing files in these programs as part of the PA. Answer all that apply.

Is there an owner or operator?

NPDES-CWA: Is there a discharge water containing pollutants with surface water through a point source (pipe, ditch, channel, conduit, etc.)?

CWA (404): Have fill or dredged material been deposited in a wetland or on the banks of a stream? Is there evidence of heavy equipment operating in ponds, streams or wetlands?

UIC-SDWA: Are fluids being disposed of to the subsurface through a well, cesspool, septic system, pit, etc.?

TSCA: Is it suspected that there are PCB's on the site which came from a source with greater than 50 ppm PCB's such as oil from electrical transformers or capacitors?

FIFRA: Is there a suspected release of pesticides from a pesticide storage site? Are there pesticide containers on site?

RCRA (D): Is there an owner or operator who is obligated to manage solid waste storage or disposal units under State solid waste or ground water protection regulations?

UST: Is it suspected that there is a leaking underground storage tank containing a product which is a hazardous substance or petroleum?

**APPENDIX D**  
**Photolog**



**PHOTO 1**

Yankton Sioux Tribal Landfill site. No visible debris or evidence of a landfill.



**APPENDIX E**  
**PA Site Reconnaissance Report**

PA SITE RECONNAISSANCE REPORT  
performed by URS Consultants, Inc.

SITE Yankton Sioux Tribal Landfill  
ADDRESS Two miles south and two miles west of Ravinia.

DATE June 7, 1994

INVESTIGATORS Mark Rudolph ; Ron Caringroto

SITE CONTACT Lawrence Kayukan, Bureau of Indian Affairs

WEATHER, WIND Sunny, approx 70-75°F, slight breeze from North

GENERAL SITE CONDITIONS (sources, operations, activities, etc.)

Site was covered over w/ an unspecified amount of  
Dirt. No visible debris or trash

CRITICAL TARGET & PATHWAY INFORMATION

- ☐ Site Access \_\_\_\_\_
- ☐ Stressed Vegetation \_\_\_\_\_
- ☐ Odors \_\_\_\_\_
- ☐ Overland Flow/Surface Water Runoff \_\_\_\_\_
- ☐ On-site Recreational Activities \_\_\_\_\_
- ☐ Endangered Species \_\_\_\_\_
- ☐ Wells \_\_\_\_\_
- ☐ Fishing Activity \_\_\_\_\_
- ☐ Water or Soil Staining \_\_\_\_\_
- ☐ Nearest Residence (address) approx 1 mile north of site

DO ANY SITE CONDITIONS POSE A THREAT TO THE ENVIRONMENT OR NEARBY POPULATION REQUIRING THAT THE SITE SAM BE NOTIFIED IMMEDIATELY AND THAT AN IMMEDIATE POTENTIAL THREAT MEMORANDUM BE SENT TO THE EPA?

No X Yes \_\_\_\_\_ (if yes, when?) \_\_\_\_\_

SIGNATURE OF INVESTIGATOR Mark Rudolph DATE 6/7/94